

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
25 August 2005 (25.08.2005)

PCT

(10) International Publication Number  
**WO 2005/078813 A1**

(51) International Patent Classification<sup>7</sup>: **H01L 33/00**

(21) International Application Number:  
PCT/KR2005/000361

(22) International Filing Date: 5 February 2005 (05.02.2005)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:  
10-2004-0009529  
13 February 2004 (13.02.2004) KR

(71) Applicant (for all designated States except US): EPIVAL-  
LEY CO., LTD. [KR/KR]; 51-2, Neungpyeong-ri, Opo-  
eup, Kwangju-si, Kyunggi-do 464-892 (KR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): YOO, Tae  
Kyung [KR/KR]; 115-603, Samsung Raemian Apt.,  
629, Mabuk-ri, Kuseong-eup, Yongin-si, Kyunggi-do  
449-912 (KR). PARK, Eun Hyun [KR/KR]; 802-405,  
Daechang Villa, Jungtap-dong, Bundang-gu, Seongnam-si,  
Kyunggi-do 463-835 (KR).

(74) Agent: AN, Sang Jeong; 512-1906, 221, Gumi-dong,  
Bundang-gu, Seongnam-si, Kyunggi-do 463-715 (KR).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,  
MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH,  
PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN,  
TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

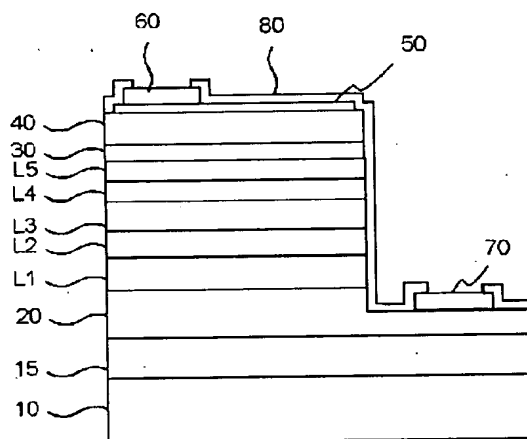
(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: III-NITRIDE COMPOUND SEMICONDUCTOR LIGHT EMITTING DEVICE



(57) Abstract: The present invention provides a III-nitride compound semiconductor light emitting device comprising an active layer (30) which emits light and is interposed between a lower contact layer (20) made of n-GaN and an upper contact layer (40) made of p-GaN, in which a sequential stack of a lattice mismatch-reducing layer L3 made of  $\text{In}_x\text{Ga}_{1-x}\text{N}$ , an electron supply layer L4 made of n-GaN or n-Al<sub>y</sub>Ga<sub>1-y</sub>N and a crystal restoration layer L5 made of  $\text{In}_z\text{Ga}_{1-z}\text{N}$  is interposed between the lower contact layer and the active layer, and further comprising an electron acceleration layer L1 made of n-GaN or undoped GaN and a heterojunction electron barrier-removing layer L2, thereby the lattice mismatch between the lower contact layer (20) and the active layer (30) can be reduced.

WO 2005/078813 A1